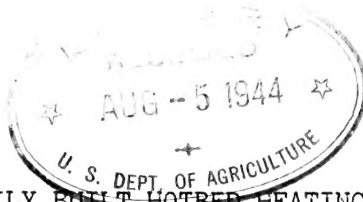


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## AN INEXPENSIVE AND EASILY BUILT HOTBED HEATING UNIT

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In connection with work on aphid-resistant alfalfa, hotbed space was required to rear aphids for infestation and to house flats of alfalfa during exposure to aphids. A deep cold frame was adapted to this purpose by fitting it with a simple L-shaped hot-water heater made from two pieces of 5-inch galvanized conductor pipe (downspouting) and an elbow. The water is heated by a 1,200-watt immersion heater of the type used in home hot-water systems. These can often be obtained from dealers in second-hand plumbing. The element used was purchased second hand for \$2. The 5-inch conductor pipe was bought for 14 cents per foot and the elbow for 60 cents. The cap cost 15 cents, and a 1½-inch galvanized lock nut into which the heating unit was screwed cost 20 cents.

The temperature control consists of a mercury tilt air switch and a magnetic switch. These are generally available around a laboratory; but in this case, since the 200-volt A.C. used would not operate the 110-volt D.C. equipment which was available, the switches were purchased at a total cost of \$18. However, a large wafer type thermostat and a non-arcing spring switch of the type used on refrigerators can be used for a lower priced control.

Dimensions and details of construction of the heater are shown in the drawing (fig. 1). The size, length, and shape of the heating pipe can be varied to suit the situation. A 10-foot length of 5-inch pipe is sufficient to maintain a temperature of 70° F. in a five-sash hotbed (6 by 15 feet). This pipe is filled with water. This heater can efficiently heat a pipe 20 feet long or a ten-sash hotbed. All seams and joints in the conductor pipe must be soldered. The immersion unit is screwed into the threaded lock nut which is soldered into the cap at the closed end of the tube. It is essential that the open end of the tube be raised about 3 inches higher than the closed end to permit the hot water to circulate the full length of the tube.

Excessive evaporation of the water in the system is prevented by a cap containing a simple valve, as shown in the illustration.

Conductor pipe is inexpensive, easily procurable, exposes a large surface, and will hold enough water to prevent rapid fluctuations in temperature. The unit is portable, and parts of the equipment may be used for other problems where controlled temperature is needed.



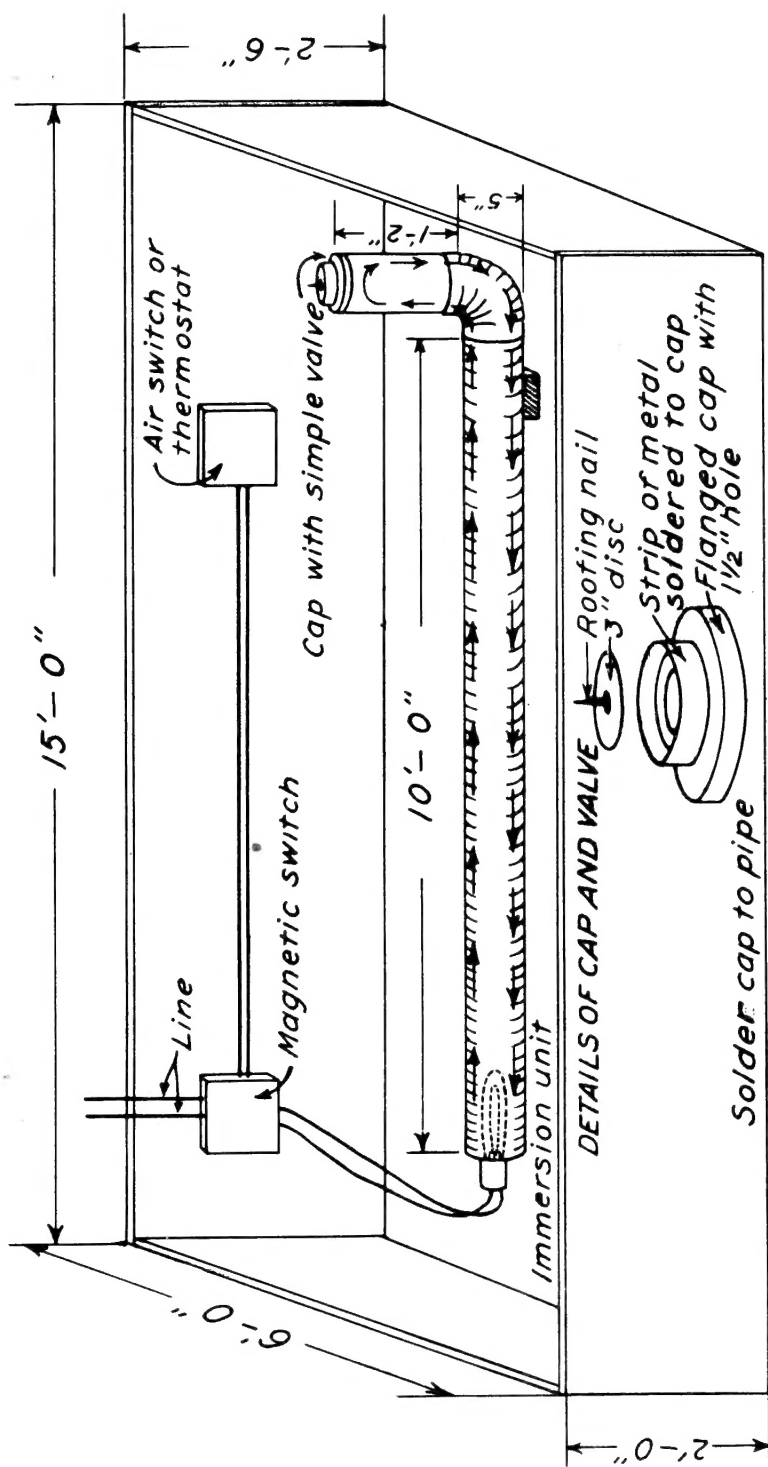


FIGURE 1. DETAILS OF A HOTBED HEATER

